

**Amendments to the Claims**

These claims will replace all prior versions, and listings, of claims in the application:

1. (canceled)

2. (canceled)

3. (canceled)

4. (canceled)

5. (canceled)

6. (canceled)

7. (canceled)

8. (canceled)

9. (previously presented) A silicon-on-insulator (SOI) photodiode, comprising:

a silicon substrate having a first portion doped with a first dopant type and a second portion doped with a second dopant type, the first and second portions forming a pn-junction;

a buried oxide layer formed on the silicon substrate;

a silicon layer formed on the buried oxide layer, wherein an amount of incident light passing through the SOI photodiode to the silicon substrate with respect to wavelength is proportional to a thickness of the silicon layer;

a field oxide layer formed on the silicon layer, wherein a thickness of the field oxide layer controls the thickness of the silicon layer;

a trench extending to the silicon substrate; and

a contact formed in the trench.

10. (previously presented) The SOI photodiode of claim 9, wherein the pn-junction is a vertical pn-junction.

11. (previously presented) The SOI photodiode of claim 9, wherein the proportion of incident light passing through the SOI photodiode to the silicon substrate is given by  $e^{-a_{\lambda} x}$ , where  $a_{\lambda}$  is an absorption coefficient of the silicon layer and  $x$  is the thickness of the silicon layer.

12. (previously presented) The SOI photodiode of claim 9, wherein the contact forms an aperture of the SOI photodiode.

13. (previously presented) A method of forming a silicon-on-insulator (SOI) photodiode, comprising:

providing an SOI structure including a silicon substrate, a buried oxide layer formed on the silicon substrate, a silicon layer formed on the buried oxide layer, and a field oxide layer formed on the silicon layer;

adjusting a thickness of the silicon layer by adjusting a thickness of the field oxide layer, wherein an amount of incident light passing through the SOI photodiode to the silicon substrate with respect to wavelength is proportional to the thickness of the silicon layer;

forming a trench to expose a portion of the silicon substrate; and

forming a contact in the trench.

14. (previously presented) The method of claim 13, wherein, prior to forming the contact, doping the exposed portion of the silicon substrate with a dopant to form a pn-junction.

15. (previously presented) The method of claim 13, wherein the silicon substrate comprises a vertical pn-junction.